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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413				
EXAMINER				
PUENTE, EVA YI ZHENG				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/639,144

**Applicant(s)**

LU, CHUN CHIAN

**Examiner**

EVA Y. PUENTE

**Art Unit**

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 12/19/07 have been fully considered but they are not persuasive. Examiner has thoroughly reviewed Applicant's arguments but firmly believes that the cited reference reasonably and properly meet the claimed limitation as rejected.

Applicant's argument – (1) Prior art Hafeez does not teach "obtaining an approximation of the pulse shaping distortion; extracting the approximation of the pulse shaping distortion from the first signal to obtain a second signal" as recited in claim 1. (2) The "pulse-shape distortion" of Hafeez does not constitute the claimed "pulse-shape distortion". (3) Rejection over claims 6, 7, 15, 17, and 20 under 35 U.S.C. 103(a) should be removed since neither Hafeez nor Shattil, nor any combination thereof, teaches "a signal processing method comprising: ...obtaining an approximation...; extracting the approximation...." as recited in independent claims.

Examiner's response – (1) As explained in the previous office action, Hafeez discloses a receiver in a wireless communication system for receiving signal (102), pulse shaping distortion is introduced along with the received signal; the received signal and pulse shaping distortion are input to a pulse-shape filter (106) and a pulse shape estimator (112). The pulse-shape response estimate can also be used to compensate for pulse-shape distortion (Col 8, L12-15). In addition, Hafeez discloses that the basic function of the transmit pulse-shaping filter is to limit the bandwidth of the transmitted signal, while the function of the receive pulse-shaping filter is to recover the transmitted

signal by filtering out noise and interference (Col 1, L13-16). Therefore, it is clear that both pulse shape filter and pulse shape estimator perform mathematical calculations on pulse shaping distortion of the received signal to remove interference. Regarding argument over limitation: "extracting the approximation of the pulse shaping distortion from the first signal to obtain a second signal", applicant did not provide sufficient reason and evidence of why Hafeez failed to disclose. Word "extracting" by definition means to separate from. Examiner believes that Hafeez teaches such limitation as shown in 316 of Fig. 3 and Col 9, L19-25. Applicant is reminded that the Examiner is entitled to give the broadest reasonable interpretation to the language of claims. Therefore, Hafeez meets claimed limitations. (2) Hafeez discloses that knowledge of pulse-shaping filters may be used to cancel interference arising from a co-channel base station by aiding channel estimation and tracking. Pulse-shaping filters are also used to provide improved channel estimation for equalization. (Col 1, L17-26). Applicant's invention is related to reduce inter-chip interference (ICI) and inter-symbol interference (ISI). Clearly, both Hafeez and applicant are in the same field of endeavor. It is well known in the wireless communication technology that pulse shaping is a process to make transmitted signal suit better to the communication channel by limiting the effective bandwidth of the transmission. Applicant's argument over Hafeez and applicant's pulse shaping distortion in different concept is confusing and lack of evidence. However, if applicant still strongly believes in such assertion, please reflect so in the claim language. Applicant is reminded that claims are rejected based on the recited claim limitations. (3) Hafeez discloses all the claimed subject matters recited in

independent claims. Shattil discloses a wireless communication system comprise an approximate solution that is obtained from a first-order perturbation calculation ([0678]). Therefore, Hafeez and Shattil in combination provide interference improvement in a wireless communication system. Grounds of rejection still maintained.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5, 8-14, 16, and 18-19 are rejected under 35 U.S.C. 102(e) as being unpatentable by Hafeez et al. (US 6,920,191).

a) Regarding to claim 1, Hafeez et al disclose a signal processing method comprising:

receiving a first wireless communication signal, the first signal including pulse shaping distortion, wherein the pulse shaping distortion is produced by pulse shaping (signal received from antenna 102 in Fig. 3; it is inherent that distortions are introduced along with received signals);

obtaining an approximation of the pulse shaping distortion (106,108,109 and 112 in Fig. 3);

extracting the approximation of the pulse shaping distortion from the first signal to obtain a second signal (316 in Fig. 3; Col 9, L19-25); and

processing the second signal to obtain a user signal (â&#n; abstract).

b) Regarding to claim 2, Hafeez et al disclose further comprising:

conducting a signal-user detection (wireless communication system; Col 1, L6-16); and

obtaining an amplitude estimate and a symbol delay for a user in a frame (113 and 314 in Fig. 3).

c) Regarding to claim 3, Hafeez et al disclose wherein the second signal has insignificant or no pulse shaping effects (pulse shaping distortion compensation; abstract; Col 8, L12-14).

d) Regarding to claim 8, Hafeez et al disclose wherein extracting the approximation of the pulse shaping distortion from the first signal comprises subtracting an approximately known function of pulse shaping from an unknown function with a time-varying channel function (Col 6, L1-Col 7, L19).

e) Regarding to claim 9, Hafeez et al disclose a signal processing method comprising:

receiving a first wireless communication signal, the first signal including non-channel distortion, wherein the non-channel distortion is produced by a non-channel function (signal received from antenna 102 in Fig. 3; it is inherent that distortions are introduced along with received signals);

obtaining an approximation of the non-channel distortion (106,108,109 and 112 in Fig. 3);

extracting the approximation of the non-channel distortion from the first signal to obtain a second signal that includes a time-varying channel function (316 in Fig. 3; Col 9, L19-25); and

processing the second signal to obtain a user signal (â abstract).

f) Regarding to claim 10, Hafeez et al disclose wherein the non-channel function comprises a transformation function (106 and 108 in Fig. 3).

g) Regarding to claim 11, Hafeez et al disclose further comprising:  
conducting a signal-user detection (wireless communication system; Col 1, L6-16); and

obtaining an amplitude estimate and a symbol delay for a user in a frame to obtain the approximation of the non-channel distortion (113 and 314 in Fig. 3).

h) Regarding to claim 12, Hafeez et al disclose wherein the second signal has insignificant or no non-channel distortion (pulse shaping distortion eliminated by 316 in Fig. 3; abstract; Col 8, L12-14).

i) Regarding to claim 16, Hafeez et al disclose wherein extracting the approximation of the non-channel distortion from the first signal comprises subtracting an approximately known non-channel distortion from an unknown distortion of a time-varying channel function (Col 6, L1-Col 7, L19).

j) Regarding to claim 18, Hafeez et al disclose a signal processing system, comprising:

a receiver for receiving a first signal for wireless communication (signal received from antenna 102 in Fig. 3);

a tracking device for obtaining an amplitude estimate and a symbol delay for a user (106,108,109,113 and 314 in Fig. 3);

an approximating device, coupled to the tracking device, for providing an approximation of non-channel distortion in the first signal, wherein the non-channel distortion is produced by a non-channel function (112 in Fig. 3; Col 8, L12-14); and

a signal-extracting device, coupled to the approximation device, for extracting the approximation of the non-channel distortion from the first signal to obtain a second signal that includes a time-varying channel function (316 in Fig. 3; Col 9, L19-25).

k) Regarding to claim 19, Hafeez et al disclose wherein the non-channel function comprises a transformation function (106 and 108 in Fig. 3).

l) Regarding to claims 4 and 13, Hafeez et al disclose wherein extracting the approximation of the pulse shaping distortion from the first signal comprises applying an equalization between the second signal and an original signal before pulse shaping (LMS Col 7, L16-20).

m) Regarding to claims 5 and 14, Hafeez et al disclose wherein extracting the approximation of the pulse shaping distortion from the first signal comprises applying a decision feedback equalization between the second signal and an approximation of an original signal before pulse shaping based on a current decision (DFE use LMS algorithm; Col 7, L16-20; pulse shape filter 106 perform approximation on the original signal).



***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6-7, 15, 17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hafeez et al. (US 6,920,191) in view of Shattil (Pub No.: US 2002/0034191).

Regarding to claims 6-7, 15, 17, and 20, Hafeez et al. disclose wherein extracting the approximation of the pulse shaping distortion from the first signal comprises applying an equalization (LMS Col 7, L16-20), and all the subject matters above except for the specific teaching of at least one order of perturbation to adjust the approximation of the pulse shaping distortion.

However, Shattil discloses a wireless communication system comprise an approximate solution that is obtained from a first-order perturbation calculation ([0678]). Therefore, it is obvious to one of ordinary skill in art to combine the teaching of perturbation algorithm taught by Shattil in the pulse shaping distortion compensator of Hafeez et al. By doing so, provide interference improvement in a wireless communication system.

***Conclusion***

**6. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Y Puente whose telephone number is 571-272-3049. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eva Yi Zheng  
/E. Y. P./  
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March 19, 2008

/CHIEH M FAN/  
Supervisory Patent Examiner, Art Unit 2611